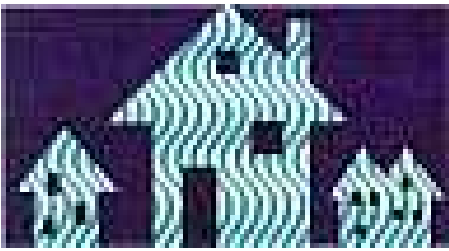


***State of Hawaii – Department of Health  
Noise, Radiation and Indoor Air Quality Branch***

***Environmental Education and Recognition Meeting  
Mauna Lani Resort, Hawaii***

Indoor Air Quality and Mold  
November 8, 2002

Jeff Eckerd, Environmental Health Specialist



**EPA - Healthy Indoor Air  
for America's Homes  
Project**

# Indoor Air Quality Concerns

- EPA studies of human exposure to air pollutants indicate that indoor air levels of many pollutants may be 2-5 times, and occasionally, more than 100 times higher than outdoor levels.
- These levels of indoor air pollutants are of particular concern because it is estimated that most people spend as much as 90% of their time indoors.
- People who may be exposed to indoor air pollutants for the longest periods of time are often those most susceptible to the effects of indoor air pollution. These groups include young children, the elderly and the chronically ill, especially those that suffer from respiratory or cardiovascular disease.



# Common Indoor Air Pollutants

- **Biological Contaminants** – Include bacteria, molds, viruses, animal dander, dust mites, cockroaches and pollen to name a few. Some may trigger allergic reactions and cause infection.
- **Volatile Organic Compounds (VOC)** – Organic chemicals are widely used in household products such as paints, wax, cleaning products and cosmetics. Symptoms of exposure may include respiratory irritation, headaches and dizziness.
- **Environmental Tobacco Smoke (ETS)** – Mixture of smoke that comes from the burning end of a cigarette, pipe or cigar and exhaled smoke that contains over 4000 compounds, 40 of which are known to be carcinogenic.
- **Combustion Products** – Stoves, heaters, fireplaces and chimneys can produce unhealthy levels of carbon monoxide, nitrogen dioxide and particulates if not ventilated properly.
- **Radon** – Colorless, odorless gas released from Uranium which may cause lung cancer when exposed to elevated levels.



# Mold – The Fungus Among Us



# What is Mold?

- Mold is a subset of fungi, which are necessary for the recycling of organic building blocks that allow plants and animals to live.
- Fungi include yeasts, molds and mildews, large mushrooms, puffballs and bracket fungi.
- Mold is a description of fungi growing on surfaces. Mildew usually refers to fungi growing on fabrics.



# Where and Why Does Mold Grow?

- Mold can grow on virtually any organic substance including paper, cloth, carpets, leather, wood, drywall, insulation, dirt and foods when moist conditions exists.
- Moisture, oxygen and a food source are necessary for mold to grow.
- The key to mold control is moisture control. **Solve moisture problems before they become mold problems!**



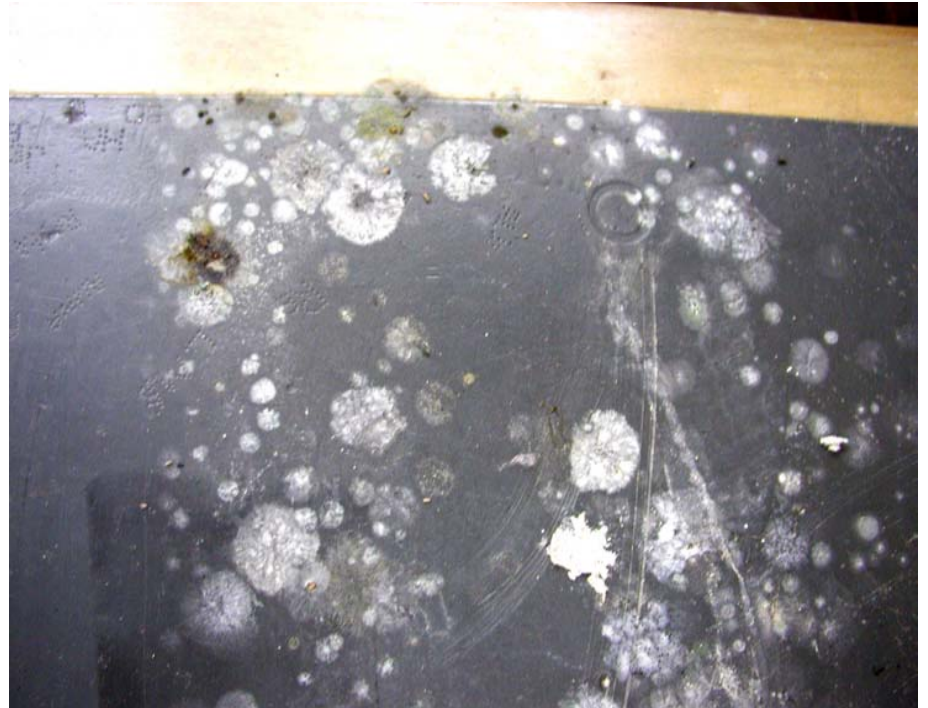
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# Mold Prevention Tips

- Fix leaky plumbing and leaks in the building envelope as soon as possible.
  - Watch for condensation and wet spots. Fix sources of moisture problems ASAP.
  - Prevent moisture due to condensation by increasing surface temperature or reducing humidity. Dehumidifiers may be necessary.
  - Keep heating, ventilation and air conditioning (HVAC) drip pans clean, flowing properly, and unobstructed.
  - Vent moisture-generating appliances, such as dryers, to the outside where possible.
  - Maintain low indoor humidity, ideally between 40-60% relative humidity, if possible.
  - Perform regular building/HVAC inspections and maintenance as scheduled.
  - Clean and dry wet or damp spots within 48 hours.
  - Don't let foundations stay wet. Provide drainage and slope the ground away from the foundation.
-

# Mold - Indoor Air Regulations and Standards

- EPA - Standards or Threshold Limit Values (TLVs) for airborne concentrations of mold, or mold spores, have not been set. As of December 2001, there are no EPA regulations or standards for airborne mold contaminants.
- State of Hawaii, Department of Health - No regulations or standards for mold contaminants. Hawaii Administrative Rules, Chapter 11-39, addresses air conditioning and ventilation systems in regards to fresh air quantities and maintenance of systems.



# Mold Remediation Guidelines

- Mold remediation is determined on a case-by-case basis. If in doubt, or when occupants report serious health concerns, you should consult a health professional.
- Cleanup methods include wet vacuum (or steam cleaning), damp-wipe, high-efficiency particulate air (HEPA) vacuum, or discarding of affected materials.
- Always use Personal Protective Equipment (PPE) when performing remediation (i.e. gloves, respirators, eye protection).



## Roof Leaks/Water Damage



## Excess Condensation and Pipe Leaks



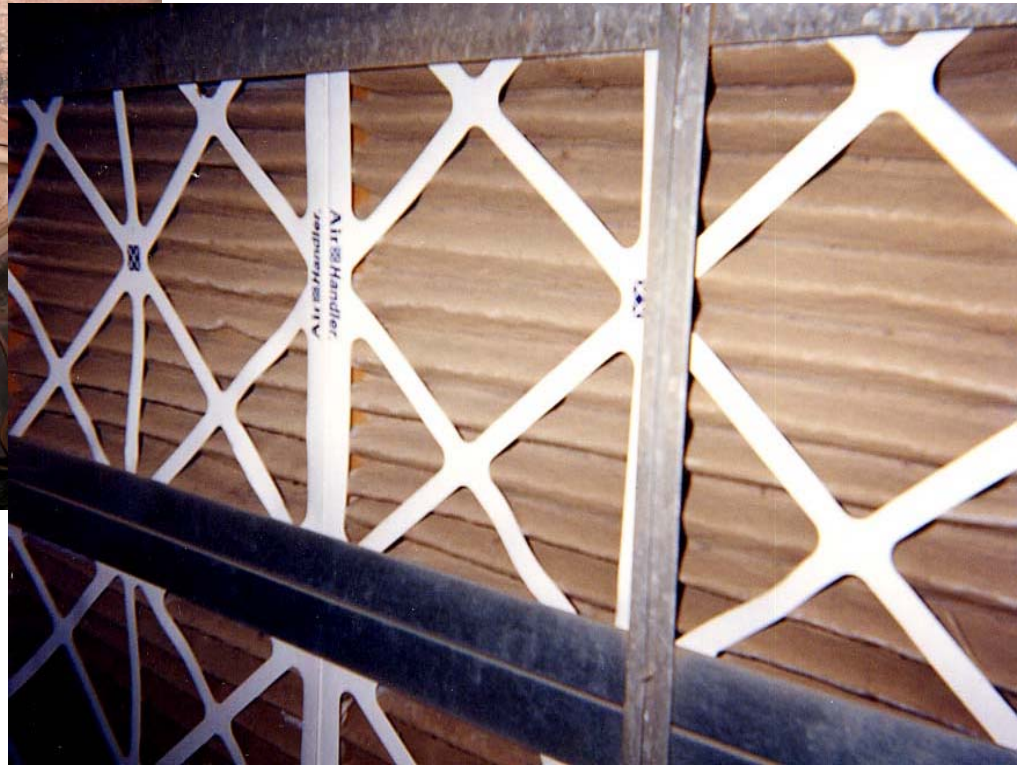
## Mold On Walls and in Ceilings



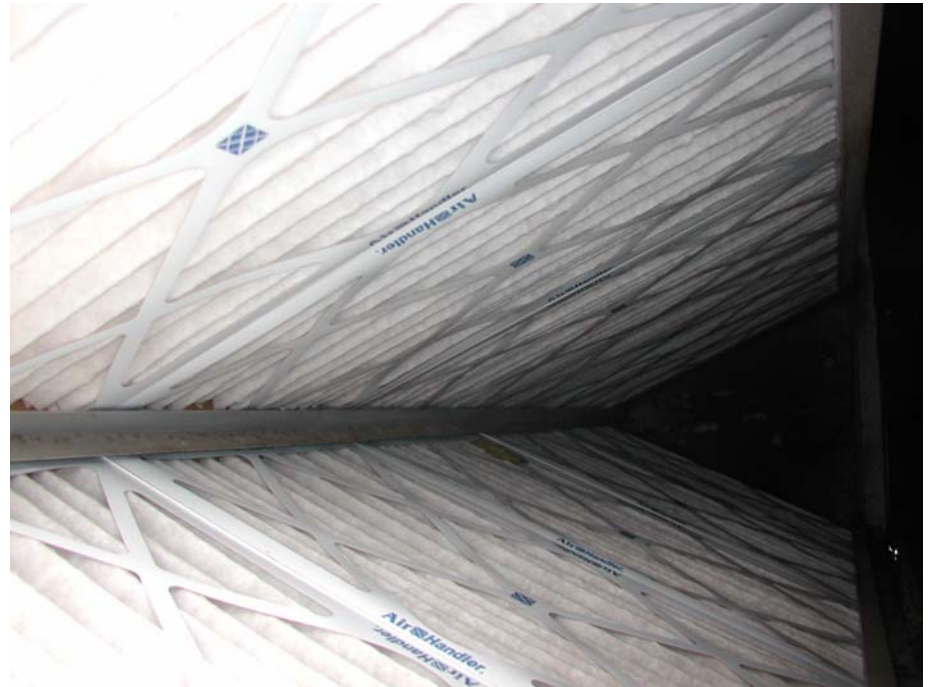
## Mold and Dirt on A/C Equipment



## Excessively Dirty Filter Banks



## Well Maintained Filters



## Cooling Coils



# Cooling Towers



# Ductwork



## Dirty Supply Air Diffusers



## Lack of an Inspection Program/Poor Maintenance



## Improperly Designed Systems



# What Can Happen If Problems Are Not Addressed

## Building's air problem remains a mystery so far

*An inspector hopes to finish his report about the Old Courthouse in Wailuku this week*

By Gary T. Kubota

gkubota@starbulletin.com

WAILUKU >> A state health inspector said he has been unable to determine the cause of bad air that forced the evacuation of a portion of the Old Courthouse building in Wailuku.

Jeff Eckerd said finding the source has been difficult since the bad-air problem occurred several weeks before his inspection and only happened once for a couple of hours.

"We don't know what it was," said Eckerd, who conducted the inspection on Thursday.

Some 12 employees with the County Prosecutor's Office complained of headaches and respiratory problems on June 20, prompting the evacuation of the top floor, occupied by some 32 employees.

Some described the smell as "metallic."

Eckerd said when he interviewed employees, their description of the smell varied widely.

"It could have been anything," he said.

County employees have been worried about indoor air quality ever since some 80 people from planning and public works were forced to evacuate the Kalana Pukui building in Wailuku in February and relocate to other facilities.

The county hopes to have the redesigning of the Kalana Pukui's ventilation system completed soon.

The Kalana Pukui building is also being cleaned of extensive mold and mildew under the ceiling tiles, after the discovery of an "active fertile colony" of fungus known to cause respiratory problems.

The fungus is called "stachybotrys sp." It was found on the surface of a water-stained ceiling in the building, but not in the air.

The fungus can be harmful, especially to the elderly, the young or those with autoimmune problems.

Eckerd said during an inspection of the Old Courthouse

building, he found spots near the air-conditioning vents that appeared to contain mold and mildew.

But he said the mold and mildew was not extensive, and he does not anticipate that the cleanup will require employees to vacate the building.

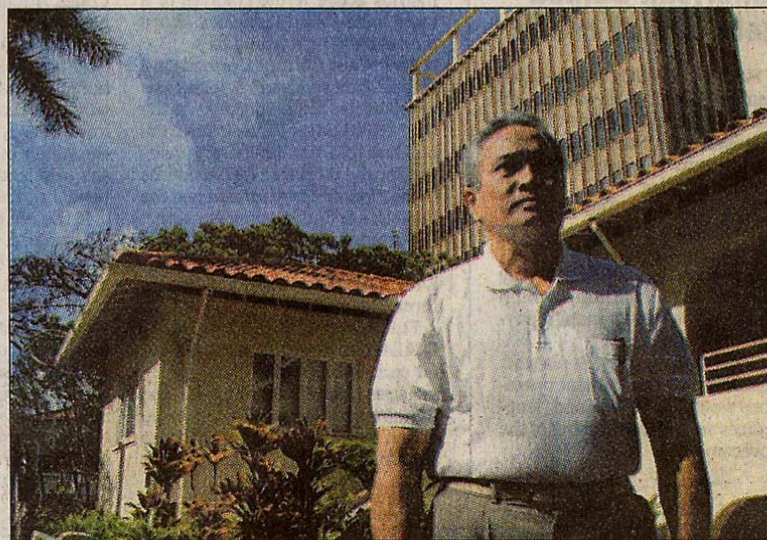
"It's something they can come in and clean up on the weekend," Eckerd said.

*County employees have been worried about indoor air quality ever since some 80 people were forced to evacuate the Kalana Pukui building in Wailuku in February.*

Eckerd, who is the only state inspector conducting indoor quality air checks in Hawaii, said he plans to work with the county on how to quicken the response time when bad-air problems occur on Maui.

He said he expects to complete his inspection report by the end of this week.

Asked to comment on the inspection, the prosecutor's administrative officer, Wayne Steel, said he was waiting to look at details in the report.



TIMOTHY HURLEY • The Honolulu Advertiser

Maui County building plans examiner Mac Aquinde was diagnosed with asthma after being exposed to pollutants in the Kalana Pukui annex in February.

## Sick building stifles Maui planners

By Timothy Hurley

ADVERTISER MAUI COUNTY BUREAU

**WAILUKU, Maui** — When land-use and building plans examiner Mac Aquinde arrived at the Maui County Planning Department early Feb. 20, the air conditioner was turned off, having been serviced the day before. So naturally he turned it on.

What blew out at him changed his life.

Within 15 minutes, he was coughing, his eyes were red and watery and his head ached. Within an hour he went home, sleeping until the next day, when he went to his doctor with chest pains and a variety of respiratory problems. The doctor sent him to the emergency room, thinking he might be having a heart attack.

Aquinde, a physically fit 53-year-old who lifted

weights and went to the gym often, eventually was examined by a pulmonary specialist in Honolulu and learned he had acquired asthma.

"I was very active," he said. "But now I don't go to the gym anymore. I get totally out of breath."

When the air conditioning was turned on in February after servicing, it not

See SICK, A2

# Who To Call If You Suspect a Problem

**State of Hawaii - Department of Health  
Noise, Radiation and Indoor Air Quality Branch  
Phone: (808) 586-5800**

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